Soliton Waves as a Firefighting Mechanism

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Introduction

The tools used to combat both structural and wild fires have changed little over the past several decades. The physics community has expended relatively little effort toward the end of addressing the question of how we may better combat fire. While the use of flame retardants such as water, foam or powders represent a fundamentally chemistry-based approach, firefighters lack even a single physics-based option for extinguishing a fire.

Abstract

The form of structured electromagnetism known as the soliton wave, in addition to myriad other potential uses, may form the basis of an ideal firefighting tool. Given the ability of these waves to achieve both hemispheric parting of electrons clouds as well as deflection of free protons (the essential ingredient of combustion,) soliton waves may be used to halt the spread of fire by preventing the direct interaction of liberated protons with fuel sources.

Provided that soliton emitters can be operated from aircraft flying along fire lines (in the case of wildfires,) continually pulsed soliton waves emitted toward the fire line from aircraft at near-90-degree angles (forward of the fire line, from the unaffected side of the line,) these waves could be as effective as water or other flame retardants at halting combustion.

An increased concentration of electrons on the side of the atoms comprising fuel sources would result in the repulsion of liberated protons via both magnetic and Coulomb forces. Furthermore, the soliton waves would have the effect of altering and perhaps inverting the angular momentum of such protons, making it less likely that they will approach neighboring atoms with sufficient rapidity to sneak past the electrons in the electron cloud of atoms comprising fuel sources.

The combination of the asymmetrical distribution of electrons around fuel sources as well as the inversion of momentum of liberated protons emanating from combusting materials would drastically reduce the rate of spread of fire. Regardless of wind direction, if *electromagnetic winds* can propel protons in the opposite direction of the *atmospheric wind*, fires may be effectively brought to a halt. While only atmospheric wind has sufficient kinetic energy to carry bodies of heated air toward fuel sources, it is the liberated proton which is the most basic denomination of spread of fire and it is therefore this which must be counteracted in our physics-based solution.

Advantages Versus Other Methods

Soliton generators, i.e. they are electrically powered, would be able to operate continually without the need to make repeated trips to retrieve additional resources. Such generators could be deployed from helicopter, drone or from ground-level. Soliton generators for firefighting could be deployed by individual homeowners as an additional layer of protection within hyperlocal areas and miniaturized versions of the device could be used within buildings.

Potential Misuse

Provided that the generators function as theorized, the emission of soliton waves into the direction of the spread of fire would have the opposite effect: Catalyzation of combustion. Just as an increased concentration of electrons makes proton-nucleus interaction (and thus, further combustion) less likely, the parting of electrons and the acceleration of protons would support combustion and accelerate the spread of flames.

Furthermore, soliton wave generators may be used in conjunction with comparatively crude explosive mechanisms in order to increase the density of overpressure waves and ensure more complete consumption of fuel/explosives. In the case of high-explosives, these explosives may be further enhanced by the incorporation of soliton waves following a detonation wave. Testing would be required in order to determine the precise extent of the benefit to yield.

Conclusion

When used responsibly, soliton wave generators may prevent billions of dollars in damage caused by fire and save many lives. Given the wide variety of applications for this form of structured electromagnetism, soliton wave physics are deserving of a greater degree of attention by researchers at large.